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MINISTRY OF ECONOMIC DEVELOPMENT

FP-02 02055
LETTERS PATENT

TYPE OF PATENT

☐ USEFULNESS MODEL ☒ INVENTION ☐ INDUSTRIAL DESIGN

IDENTIFICATION

PRIORITY COUNTRY: _____ REGISTRY No. _____ DATE: _____	REGISTRATION No. <u>1396/92</u> DATE: 08-28-92	RECORD No. <u>53,935</u> DATE: <u>08-28-1992</u> EXPIRATION: 08-28-2012
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DESCRIPTION

TECHNICAL TITLE OF THE INVENTION OR CREATION:

"METHOD TO PREPARE A DRILLING FLUID CONTAINING DISPERSED ASPHALTITE"

OWNER(S) AND ADDRESSES: SUN DRILLING PRODUCTS CORPORATION, a United States corporation, with headquarters in Bellechasse. :Louisiana, United States of America.

THE ABOVE OWNER HAS THE RIGHT TO USE, SELL, AND MANAGE THE OBJECT OF THE PRESENT INVENTION, A RIGHT THAT CAN BE TRANSFERRED TO HIS HEIRS AND ASSIGNS. THE STATE DOES NOT GUARANTEE THE ACCURACY, PRIORITY OR USEFULNESS OF THE INVENTION, PATENTED IMPROVEMENT, MODEL OR DRAWINGS. THE PERTINENT FEES WERE PAID PURSUANT TO RECEIPT No. 4182 OF 08-28-1992 THE FIRST ANNUAL INSTALLMENT (Bs. 100.00) AND PURSUANT TO RECEIPT No. 72467 OF 07-17-95 THE DOCUMENTARY TAX (Bs 4.00) AND PROTOCOL PAPER (Bs. 1.00) TOTAL Bs. 105.00
CARACAS AUGUST 01 OF 1996
SIGNATURE OF PARTY OF RECORD
/s/ Illegible

FACSIMILE OF DRAWING OR INDUSTRIAL MODEL

TITLE SUBSCRIBED ON 06/14/99 BY DR. FLOR MARIA ARVELO, REGISTRAR OF INDUSTRIAL PROPERTY, PURSUANT TO RESOLUTION No. 081 OF 04/30/98, OFFICIAL GAZETTE No. 36,456 OF 05/19/98 BY VIRTUE OF NOT BEING TIMELY SIGNED BY THE COMPETENT OFFICIAL.

(AFFIXED WITH GLUE)

/s/ Illegible

penetrates the spaces in the porosities of the sand as the drilling advances in the formation. It is believed that a plastic flow mechanism permits the carbon black or asphaltite to enter the porosities, reducing thereby the loss of fluid or the invasion of muds and with the tendency to agglomerate the sands and avoid collapses. The carbon black or asphaltite tends to consolidate in the form of monolithic plate on the surface of the walls of the hole, thus ostensibly reducing fluid loss.

Nevertheless, the asphaltite is by nature extremely hydrophobic and therefore is directly immiscible with water or water based drilling fluids. Therefore, it is very difficult to use asphaltite as an effective drilling fluid additive.

In the past, attempts were made to manufacture products based on asphaltite that were more compatible with the drilling fluids. However, none of those attempts was successful.

Even more so, in typical drilling muds, the asphaltic material is packed in fifty pound bags and spilled on the mud hoppers of the drill, in proportions that range from one to fifty pounds per barrel of mud. Because asphalt is extremely hydrophobic to water, the mud system must be added to the water. However, this process is extremely costly since the surfactant could be used in other solid materials of the mud system, such as barite, bentonite and the cuttings that come off the drilling.

More so, the process mentioned is extremely costly since it does not allow the asphaltite sufficient retention time in the aqueous phase of the drilling fluid for it to disperse in small particles. Consequently, a great amount of material is lost in the fluid screening, on its first pass through the perforation. The bit screen uses mesh of up to 250 holes per inch; nevertheless, the 80-100 mesh are the ones normally used. In using the method

This invention provides a process to manufacture an additive for water based drilling fluids, and it includes the following steps:

(a) to blend the hydrophobic asphaltite with a surfactant or with a dispersing agent, and

(b) to cut said mixture from step (a) by mechanical means long enough to permit conversion of the hydrophobic asphaltite into hydrophilic asphaltite.

This invention also provides an additive for water based drilling fluid, which is prepared for the process described above.

This invention provides also a water based drilling fluid, which consists of water and water based drilling fluid additive that is manufactured as described above.

This invention provides also a process to improve the properties of a drilling fluid during the ¹[sic] together with a drilling fluid. The additive is blended with the drilling fluid in an amount that sufficiently reduces the fluid loss and, consequently, the thickness of the wall cake.

This invention provides also a process for drilling a well with a spindle drill or rotating bit which includes cutting a hole with said drill or bit, at the same time that a drilling mud is made to circulate through the hole that is being opened. The drilling mud consists of an additive such as the one described above, said additive being blended with the drilling mud in an amount that sufficiently reduces fluid loss, as well as the thickness of the cake of the well wall.

The process of this invention offers a superior method of previously dispersing and, therefore, wetting the surface of the individual particles of an asphaltite, such as Gilsonite with a surfactant, an emulsifier or a dispersant, before adding the product to the drilling

¹ TRANSLATOR'S NOTE: There seems to be some text missing in the original..

In this invention, the asphaltite particles are dispersed and have an average size much finer than their original sizes due to the mechanical shearing stress action in the environment of a surfactant or dispersing agent. The asphaltite particles are dispersed in much finer particles; therefore, they expose larger surfaces each time [Text missing in the original Spanish version] change into highly hydrophilic particles. This particle based product is therefore easily and rapidly blended and disperses in an equally fast manner when blended with the water based drilling muds.

Any asphaltic material inherently hydrophobic can be used in this invention. High grade, pulverized Gilsonite is preferred, however

The surfactants used in this invention can, for example, be selected from the ethoxylated phenols, alcohols, glycols or the fatty acid materials. The preferred surfactant agent is ethoxylated glycol. The dispersing agents to be used in this invention can be selected from, for example, potassium hydroxide, sodium hydroxide or lignite materials. The surfactant, as well as the dispersing, agents can be used in liquid or solid state although those in liquid state are preferred.

The asphaltite blended with the surfactant or dispersing agent will be subject to an extreme cutting or mechanical shearing action, which will impart hydrophilic properties to the asphaltite particles. The mixture must be subjected to a cutting preferably at 1,700 rpm during at least 60 minutes.

A typical method of cutting the liquid mixture is obtained through a mechanical disperser, such as ROTOSTAT (R) 200 XP-200, manufactured and sold by Adblend, Inc., of Londonderry, N.H., U.S.A.

EXAMPLE 1

Improvement of fluid loss control under low temperature and high pressure and similarly reduction of fluid loss at low pressures.

The fluids specified in Table 1 below were circulated 25 times through a No. 100 mesh and, subsequently, all the tests whose parameters appear in the said Table 1 were conducted.

TABLE 1

	Mud Base	Gilsonite at 2% Vol.	Reduction Percentage	2% Volume Invention	Reduction Percentage
Fluid loss (ml) at 100 lb/in ²	5.4	4.4	19%	1.8	67%
Fluid loss (ml) at 500 lb/in ² <u>and at 300°</u>	29.5	21.2	28%	11.0	63%

Approximately 95% of the additive of this invention was retained in the drilling fluid after 25 rounds, while only 44% of the dry product was retained pursuant to the conventional method. These calculations were based on the product retained in 100 mesh, which were gathered and dried and later [text missing]

EXAMPLE 2

Decrease in thickness of cake filter

drilled. The lubricity of the drilling fluid was measured based on the capacity of the drilling fluid to reduce the friction coefficient between two surfaces, with the fluid being located between those two surfaces. This invention reduced the lubricity by forming a separation film between both surfaces, thus reducing the tendency to increase the thickness of the cake.

EXAMPLE 4

Improved properties of the fluidity of the drilling fluid

The results shown in Table 4 were obtained using a montmorillonite mud and water.

flow of the drilling fluids towards the formation. This information, therefore, reduces the amount of the capillary attraction forces that are present in the minimal fractures of the well hole.

It will be obvious to specialized experts that various modifications and alterations can be made to this invention without leaving the intent and the scope thereof. Therefore, the aim of the invention is to cover all those variations or modifications that can be made to it as long as these fall inside the scope of the claims that follow or their equivalent.

9. A process for the manufacture of an additive for water based drilling fluids as claimed in No. 8, in which the said hydrophilic asphaltite is of a dimension that allows 90% thereof to flow through the No. 200 mesh of the vibrating screen.
10. An additive for water based drilling fluids prepared in accordance with Claim 8.
11. A process for the manufacture of an additive for water based drilling fluids as claimed in No. 1 wherein the surfactant or dispersing agent is a liquid.
12. An additive for water based drilling fluids prepared in accordance with claim 1.
13. A process for the manufacture of an additive for water based fluid as claimed in No. 1 wherein the mixture of step (a) is cut by mechanical shearer during a minimum of 10,000 times/ second during a minimum period of 2 hours.
14. An additive for drilling fluids prepared in accordance to claim 13.
15. A process for the manufacture of an additive for drilling fluids in accordance with claim 1, wherein the mixture of step (a) is subjected to mechanical cut 10,000 times/ second during at least 2 hours.
16. An additive for water based drilling fluids prepared in accordance with claim 15.
17. A process for the manufacture of an additive for water based drilling fluids in accordance with Claim 1, wherein the mixture of step (a) is subjected to mechanical cut [text missing] (a) is mechanically cut at least 10,000 times/sec. during at least 1 hour.
18. A process for the manufacture of an additive for drilling fluids as claimed in No. 1, wherein the mixture of step (a) is subjected to mechanical cut by a mixer that has an angular cutting speed at the end of the propellant of at least 40 feet per second and the mixture of step (a) is cut at a speed of 10,000 times/sec. for at least 2 hours.

selected from a group consisting of potassium hydroxide, sodium hydroxide, and lignite materials.

26. A process for the manufacture of for an additive for water based drilling fluids in accordance with Claim 25, wherein the asphaltite mentioned is Gilsonite.

27. An additive for water based drilling fluids prepared in accordance with Claim 26.

28. An additive for water based drilling fluids prepared in accordance with Claim 25.

29. An additive for water based drilling fluids which consists of a hydrophilic asphaltite and a surfactant or dispersing agent.

30. An additive for aqueous based drilling fluids in accordance with Claim 29 where the mentioned asphaltite is Gilsonite.

31. An additive for water based drilling fluid in accordance with Claim 30 where the mentioned hydrophilic asphaltite is of a dimension such that 90% thereof flows through [text missing]

water, and an additive for water based drilling fluid in accordance with Claim 31.

33. A water based drilling fluid and an additive for drilling fluids in accordance with Claim 30.

34. A water based drilling fluid in accordance with Claim 29 where the hydrophilic asphaltite is of a size such that 90% of it flows through 200 mesh of the vibrating screen.

35. A water based drilling fluid which consists of water and an additive for water based drilling fluid in accordance with Claim 34.

36. An additive for water based drilling fluids in accordance with Claim 29 where the mentioned additive has a pH value of approximately 8.

44. An additive for water based drilling fluids in accordance with claim 43 wherein the mentioned alphanite is Gilsonite.

45. A water based drilling fluid which consists of water and an additive for water based drilling fluids in accordance with Claim 44.

46. A water based drilling fluid which consists of water and an additive for water based drilling fluids [text missing]

in accordance with Claim 29 where the mentioned surfactant is a glycol, and the mentioned dispersing agent is selected from the group consisting of potassium hydroxide, sodium hydroxide, and lignite type materials.

48. An additive for drilling fluids in accordance with Claim 29 where the surfactant glycol is used.